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chapters the author traces the flight of the Indians with their four woman captives across Minnesota to the Big Sioux and James rivers in Dakota. There they were later overtaken by friendly Indians, who succeeded in ransoming two of the captives, the other two having, in the meantime, been brutally murdered. The three concluding chapters are devoted, respectively, to an account of the futile attempts to capture and punish Inkpaduta and his band, to the memorial tributes of Iowa, and to a survey of the changes in the frontiers of both states following the removal of the Indians beyond their borders.

The author has drawn his information from a wide range of original and secondary material, the principal source being the printed narratives of Abigail Gardner, one of the captives. Additional source material on this subject has come to light recently in the Minnesota territorial archives of the governor's office, now in the custody of the Minnesota Historical Society. This includes a report of Charles E. Flandrau, dated June 1, 1857, regarding the ransom of the captives, a canceled draft for \$3,500 drawn by Governor Medary on the territorial treasury for expenses incurred in their rescue, and letters and papers concerning the alarm of the settlers in southern Minnesota and the pursuit of Inkpaduta and his band.

Mr. Teakle's volume is neatly printed and attractively bound, and is supplied with copious notes and an adequate index. It is lacking, however, in maps and other illustrative material which would add to the lucidity of the narrative. The absence of a bibliography giving critical evaluations of the authorities consulted is also a source of disappointment.

ETHEL B. VIRTUE.

Preliminary Report on the Geology of East Central Minnesota including the Cuyuna Iron-Ore District (Minnesota Geological Survey, *Bulletins*, no. 15). By E. C. HARDER and A. W. JOHNSTON. (Minneapolis, the University of Minnesota, 1918. vi, 178 p. Maps, sections, plates)

Unlike the Vermilion and Mesabi ore ranges of northeastern Minnesota, north of Lake Superior, which rise in prominent ridges and hills along certain stretches, with many rock outcrops,

the Cuyuna district has only low hills, covered generally by glacial and modified drift deposits with no exposures of ore-bearing rock formations. The areas known by strong magnetic attraction to have beds of iron under the drift are comprised within a radius of about sixty-five miles, from near the center of Aitkin County, west-southwest across Crow Wing County to the northwest part of Morrison County and the east edge of Todd County.

Preliminary to the special study of the Cuyuna district, made possible within recent years through the operations of exploring and mining companies, a thorough examination of the major structure of the rock outcrops lying west, south, and east of it has been made, the results of which are reported in pages 15 to 94 of the present study. The latter half of the *Report* is devoted to the Cuyuna district. The first indications of the presence of iron ore in the district were noted during the Northern Pacific Railroad surveys in 1867. It was not until 1890, however, that magnetic surveys were undertaken for the purpose of mapping the area showing the presence of iron. These surveys were conducted by Mr. Cuyler Adams and covered a period of thirteen years. By 1903 Mr. Adams succeeded in locating two lines of maximum magnetic attraction. He at once began drilling into the ore beneath the drift at various points along the southern line and in the following summer exploration work was started.

The history of the rapid development of mining operations in the Cuyuna area is given in pages 96 to 107 of the *Report*. During the first six years of ore production, from 1911 to 1916, twenty-one mines were opened, all in Crow Wing County, the most eastern being near Cuyuna and Deerwood and the most western at Barrows, four miles southwest of Brainerd. From 181,224 tons of ore shipped in 1911 by the Kennedy mine, the annual production gradually increased to 1,802,979 tons in 1916, the total for the six years being reported as 5,116,358 tons. Several of the northeastern mines have iron ores containing from ten to thirty per cent manganese, which imparts to iron and steel made therefrom greatly increased elasticity and hardness. The first shipments of the manganiferous iron ores were 27,300 tons in 1913. With the beginning of the great war in Europe, the supply of manganese ore previously imported to the United States was no longer obtainable, and as a result the manganiferous ore

mined here from 1914 to the end of 1916 amounted to 369,090 tons, being about a fourteenth part of the whole ore production of the district.

A general discussion of the geology of the Cuyuna area followed by detailed studies of the geology of the principal mines completes the *Report*. As its title indicates, the work on this region of the state, which was done jointly by the geological surveys of Minnesota and of the United States, is preliminary in character, the final report being necessarily delayed until further development work shall furnish more complete data than are obtainable at present.

WARREN UPHAM.

South Dakota Historical Collections. Volume 9. Compiled by the State Department of History. (Pierre, Hippie Printing Company, 1918. 616 p. Illustrations)

As is usual in the series to which it belongs, the volume contains the proceedings of the eighth biennial meeting of the State Historical Society of South Dakota, reviews of the "Progress of South Dakota" in 1916 and 1917, including vital and other statistics, and a number of historical papers. Among the latter are several closely connected with Minnesota history. Of especial interest is the abstract of the "Fort Tecumseh and Fort Pierre Journal and Letter Books," for the period from 1830 to 1848, which chronicles the local activities of the American Fur Company at these posts. The abstract was made by Charles E. De Land from the original manuscripts in the possession of the Missouri Historical Society. Annotations for the documents are supplied by Doane Robinson. The probability that Le Sueur penetrated west of the mouth of the Wisconsin River as far as the site of Sioux Falls on the Big Sioux River in 1683 in search of furs is discussed in a second article entitled "The Lesueur Tradition" by Doane Robinson, who was led to a study of the subject by data supplied him in 1883 by Dr. Edward D. Neill, at that time secretary of the Minnesota Historical Society. In "Expeditions into Dakota," C. Stanley Stevenson traces the movements of two exploring parties in South Dakota in 1844 and 1845: the expedition under Captain James Allen, which started from Fort